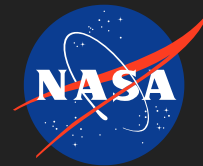


High-Density Diffraction Imaging and Non-Imaging Grating Elements for EUV and X-ray Spectroscopy Fabricated by DUV Reduction

Photolithography, Phase II

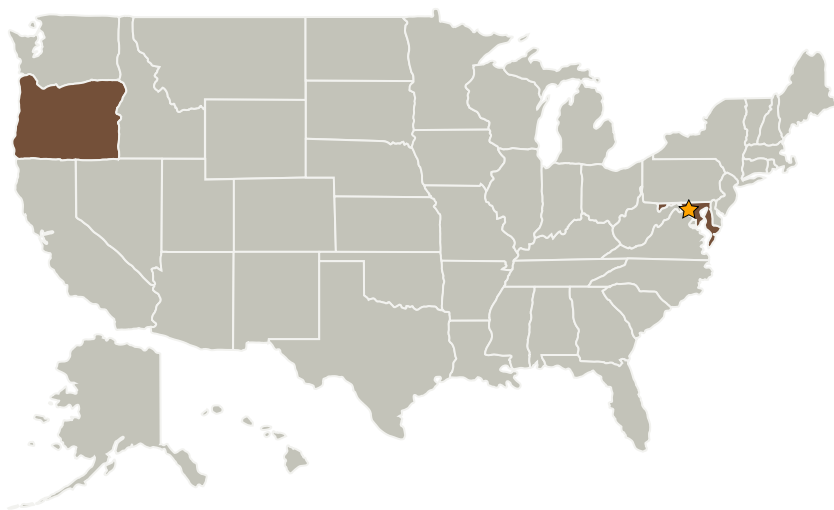
Completed Technology Project (2007 - 2009)



Project Introduction

Diffraction gratings are powerful tools for the spectral analysis of electromagnetic radiation. Properties of gratings are determined by available fabrication means -- which have not changed substantially in 50 years. Modern photolithography, now approaching nanometer resolution, may revolutionize the way many gratings are made and, through greater design flexibility, how gratings function. Over 1011 pixels, each smaller than 100 nm and collectively spanning areas of multiple centimeters, can be addressed individually with nanometer-scale absolute positioning accuracy by modern lithographic tools, thereby making it possible to create gratings with virtually any desired line curvature, variable line spacing, length and thickness -- features largely beyond traditional fabrication means. LightSmyth Technologies proposes to leverage these state-of-the-art photolithographic patterning tools to design flat imaging gratings that combine dispersive grating function with one- and two-dimensional focusing. Importantly, diffractive, aka holographic, focusing may have substantially lower aberration in low f-number or high incidence angle configurations. Line spacing and curvature do the focusing. This design and fabrication strategy will be applied to the development of gratings for NASA's NEXUS effort and other advanced grating products of value to NASA and the commercial markets -- all of which leverage on the innovative fabrication platform LightSmyth brings to the diffractive market.

Primary U.S. Work Locations and Key Partners



High-Density Diffraction Imaging and Non-Imaging Grating Elements for EUV and X-ray Spectroscopy Fabricated by DUV Reduction Photolithography, Phase II

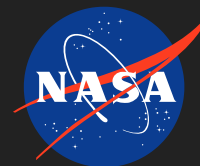
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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
LightSmyth Technologies	Supporting Organization	Industry	Eugene, Oregon

Primary U.S. Work Locations	
Maryland	Oregon

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes